

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Dana Alexa Totir et al.                      Art Unit : 1745  
Serial No. : 10/800,905                                      Examiner : Raymond Alejandro  
Filed : March 15, 2004                                      Conf. No. : 1479  
Title : NON-AQUEOUS ELECTROCHEMICAL CELLS

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

FOURTH DECLARATION OF DANA ALEXA TOTIR, KIRAKODU S.  
NANJUNDASWAMY AND MICHAEL POZIN UNDER 37 C.F.R. § 1.131

1. We are the inventors of the inventions claimed in the above-captioned patent application. The following work was conducted in the United States.

2. Two laboratory notebook pages from a laboratory notebook of Dana Alex Totir are attached. The notebook pages are signed by Ms. Totir and are dated prior to December 3, 2002. The two pages are true and complete copies from the original notebook, except that the dates on the laboratory notebook pages have been whited out and information is highlighted as described below.

3. The laboratory notebook pages demonstrate that electrochemical cells covered by claims 1-5, 8-12, 14-24, 28, 31-35, 39-43, and 45-46 were made and used prior to July 29, 2002.

(a) Some of the information on the notebook pages is highlighted for convenience. See in particular the highlighted information next to "Cell #1" on page 2489-110 and "Cell #2" on page 2489-111. The electrochemical cells were coin cell models that included a plastic housing, a cathode including "9-EMD" (9-electrolytic manganese dioxide) on a "primed Al" (aluminum) current collector. The aluminum current collector in turn was pressed on an "SS grid". SS is stainless steel, and the aluminum current collector thus was in contact with a second metal surface (the stainless steel) different from the surface of the aluminum current collector. The cells included a "Li" (lithium) anode and an electrolyte including "0.05 M" (page 2489-110) or "0.03 M" (page 2489-111) LiBOB." LiBOB is lithium bis(oxalato)borate. Thus, the electrochemical cells described on laboratory notebook pages 2489-110 and 2489-111 include all of the requirements of claims 1-2, 5, 8-12, 31-35, and 45-46.

(b) Laboratory notebook pages 2489-110 and 2489-111 refer to “LiBOB in TDE10” in the highlighted information next to “Cell #1” and “Cell #2”. TDE10 is an internal name for an electrolyte that includes, among other ingredients, lithium trifluoromethanesulfonate. Thus, electrochemical cells on laboratory notebook pages 2489-110 and 2489-111 also include all of the requirements of claims 3 and 4.

(c) The aluminum cathode current collector used in the electrochemical cells on laboratory notebook pages 2489-110 and 2489-111 had a size of at least one dimension greater than 2 millimeters. Thus, the electrochemical cells on laboratory notebook pages 2489-110 and 2489-111 include all of the requirements of claims 14-16.

(d) The electrochemical cells on laboratory notebook pages 2489-110 and 2489-111 were designed to be discharged once and then discarded, and thus are primary electrochemical cells as opposed to secondary (rechargeable) electrochemical cells. Thus, the electrochemical cells on laboratory notebook pages 2489-110 and 2489-111 meet all of the requirements of claims 17-24, 28, and 39-43.

4. We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that those statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.



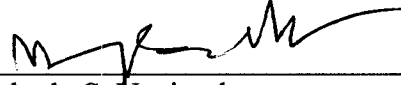
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Dana Alexa Totir

06/03/08

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Date



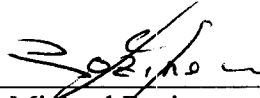
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Kirakodu S. Nanjundaswamy

05.28.2008

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Date



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Michael Pozin

05.19.08

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Date

Fish & Richardson P.C.  
225 Franklin Street  
Boston, MA 02110  
Telephone: (617) 542-5070  
Facsimile: (617) 542-8906

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Subject Matter

H corrosion: cor all this were inconsistent (results very over a large range)

Must test in H<sub>2</sub>O of cells.

- Tests:
- H<sub>2</sub> back cathodes pressed in SS grid in H<sub>2</sub> contact
  - H<sub>2</sub>O, 100  $\mu$  test
  - corrosion of 43A can and of H<sub>2</sub> alloys @ 3.8V (or 3.7)

Impedance measurements with Ag pseudo-reference electrode.

3-electrode cell w. Ag pseudo-reference electrode, Li counter and reference electrode

measure OCV of Ag electrode w. Li reference in TBEO

CV of Ag (WE) vs Li (RE) in Potassium in PC/EC

CV of Ag (WE), Li (RE), Li (CE) w. Potassium in PC/EC

Ag (WE), Ag (RE), Li (CE) w. Potassium in PC/EC

to compare the peak potential for Ag (RE) and Li (RE) to find out the potential difference.

Cell

PC and TBEO in a primed K, PD control 1651 732

pressed in SS grid in galvanized Ni strip (4x1)

2x20 cm, 0.05 M LiClO<sub>4</sub> in TBEO (prop)

1x2 cm, 100  $\mu$  Ag wire

H<sub>2</sub>O test (33 mV)

Experiments

- DE 2110 a.1. cor - Au (W), Li (R), Li (C), 1 mM ferrocene in TBEO, CV between 2.7 - 3.7 V @ 20 mV/sec.
- DE 2110 a.2. cor - Ag (W), Au (C), Li (R), 1 mM ferrocene in TBEO - open circuit experiment to monitor Ag potential vs. Li
- DE 2110 a.3. cor - Au (W), Li (C), Ag (R) - 1 mM ferrocene in TBEO - PDA tit. 0 - 0.7 V vs. ref @ 20 mV/sec
- DE 2110 a.4. cor - Au (W), Li (C), Ag (R) - 1 mM ferrocene in TBEO CV -0.6 - 0 V vs. ref @ 20 mV/sec
- DE 2110 a.5. cor - Same as above CV tit. -0.5 and 0 V vs. ref @ 20 mV/sec

Witnessed & Understood by me,

Date

Recorded by

Date

*Mander*

Date

*JP*

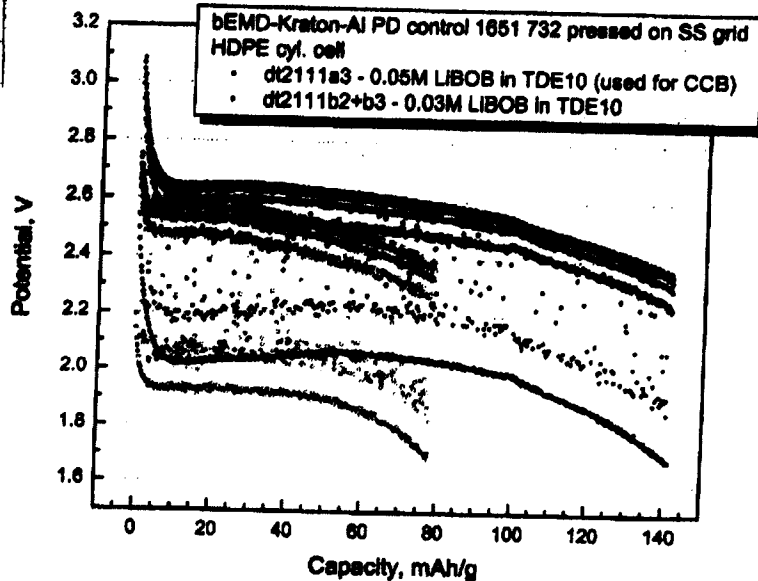
Subject Matter

- dt 2111 a1. cor - Cell #1 described in page 10 - stopped after 170 pulses  
HEC test @ 33 mA
- dt 2111 a2. cor - OCV for 2h (cell #1)
- dt 2111 a3. cor - Cell #1, HEC test, 33 mA, 600 pulses

Cell #2:

$\beta$ -CRIS Kraton in primed H, PD control 1651 732  
pressed on SS grid w. g-t welded Ni strip (50)  
d400 Celgard, 1 ml 0.03 M LiBOB in TDE10 (p.p.)  
1x2 G, HEC cyl. cell.

- dt 2111 b1. cor - open circuit, 2h
- dt 2111 b2. cor - HEC test, 33 mA, 500 pulses
- dt 2111 b3. cor - HEC test, 33 mA, additional # of pulses  
(collected next day)



Witnessed &amp; Understood by me,

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Date

Date

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Date